

REMARKS

The Office Action mailed May 21, 2004 has been carefully reviewed and the foregoing amendment has been made in consequence thereof.

Claims 1-19 are now pending in this application. Claims 1-19 are rejected.

The rejection of Claims 2, 4, 6, 16, and 17 under 35 U.S.C. § 112, second paragraph is respectfully traversed.

Applicants respectfully submit that Claims 2, 4, 6, 16, and 17 satisfy the requirements of Section 112, second paragraph. More specifically, Applicants respectfully submit that an artisan of ordinary skill in the art would understand the invention, after reading the specification, in view of the Figures. Regarding Claims 2, 16, and 17, at page 4, lines 14-15, for example, the specification defines the dynamic system operating inputs to include at least data representing an operating pressure and vibratory environment. With respect to Claim 4, at page 4, lines 17-18, for example, the specification defines the required geometry inputs to include data representing bellows pitch and bellows mating tube diameters.

With respect to Claim 6, the stiffness multiplier and the system stiffness are distinct and as a result it is proper to direct limitations to them within separate dependent claims. For example, at page 5, lines 1-2, Applicants respectfully submit that the specification describes how the dynamic stiffness multiplier is obtained with a regression equation that is derived based on dynamic stiffness test data obtained as a result of testing several different shrouded bellows configurations. In contrast, as described at page 5, lines 5-9, for example, the system stiffness is obtained by using an analytical model of the sub-system by using the empirically derived stiffness multiplier and a standard geometry bellows element.

Accordingly, for at least the reasons set forth above, Applicants respectfully request that the Section 112 second paragraph rejection of Claims 2, 4, 6, 16, and 17 be withdrawn.

The rejection of Claims 1 and 2 under 35 U.S.C. §101 is respectfully traversed. Specifically, Claim 1 has been amended to recite a method comprising the steps of “providing at least one tube sub-system including a plurality of shrouded bellows

components, determining a stiffness multiplier within each of the shrouded bellows components from input values, using the determined stiffness multiplier in a model using a standard geometry element and a flexibility factor based upon the stiffness multiplier to predict a natural frequency response, and determining locations for duct supports.” As such, Claim 1 recites a method for predicting natural frequency responses which produce the tangible result of determining locations for duct supports. Claim 2 depends from Claim 1. Accordingly, for at least the reasons set forth above, Applicants respectfully request the Section 101 rejection of Claims 1 and 2 be withdrawn.

The rejection of Claims 1-19 under 35 U.S.C. § 103 as being unpatentable over Rosemount Inc. (Technical Data Sheet “Pressure Fundamentals and Transmitter Selection” 1998) “Rosemount”, in view of Broman, et al. (“Modeling Flexible Bellows by Standard Beam Finite Elements” 1999) is respectfully traversed.

Rosemount describes the fundamentals of pressure measurement and also describes factors that should be considered when selecting a pressure transmitter for use inside mechanical elements. Notably, Rosemount does not describe applying pressure measurement to modeling or simulation.

Broman, et al. describe modeling flexible bellows using standard beam finite elements within I-DEAS Master Series 6 modeling software. Notably, Broman, et al. do not describe conducting sub-system testing to derive a stiffness multiplier from a broad range of sub-system sizes and operating conditions. Nor do Broman, et al. describe using the stiffness multiplier as an input to a standard bellows element.

Applicants respectfully submit that the Section 103 rejection of the presently pending claims is not a proper rejection. Obviousness cannot be established by merely suggesting that it would have been an obvious to one of ordinary skill in the art to modify Rosemount in view of Broman, et al. More specifically, as is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. Neither Rosemount nor Broman, et al., considered alone or in combination, describes or suggests the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicants respectfully submit that it would not be obvious to one skilled in the art to combine

Rosemount with Broman, et al. because there is no motivation to combine the references suggested in the art. Rather, the Examiner has not pointed to any prior art that teaches or suggests to combine the disclosures, other than Applicants' own teaching. Only the conclusory statement that "it would have been obvious to one of ordinary skill in the art to use Broman et al. to modify Rosemount since it would have been advantageous to model real-time events to confront or eliminate safety hazards due to the possibility of underestimating pressure states and natural frequencies values."

More specifically, it is respectfully submitted that a *prima facie* case of obviousness has not been established. As explained by the Federal Circuit, "to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant." In re Kotzab, 54 USPQ2d 1308, 1316 (Fed. Cir. 2000). MPEP 2143.01.

Moreover, the Federal Circuit has determined that:

[I]t is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that "[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention."

In re Fitch, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992). Further, under Section 103, "it is impermissible . . . to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art." In re Wesslau, 147 USPQ 391, 393 (CCPA 1965). Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicants' disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991).

Moreover, Applicants submit that the present Section 103 rejection is improper, as the rejection is merely based on a combination of teachings selected in an attempt to deprecate the claimed invention. More specifically, Rosemount is merely cited for describing pressure measurement fundamentals related to industry, and factors that should be considered in

selecting a pressure transmitter for use inside mechanical elements, and Broman, et al. is merely cited for describing modeling of flexible bellows by standard beam finite elements by way of I-DEAS Master Series 6 modeling software. Since there is no teaching nor suggestion in the cited art for the claimed combination, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicants request that the Section 103 rejection of Claims 3-20 be withdrawn.

In addition, in the present case, no suggestion nor motivation to combine the cited art, nor any reasonable expectation of success has been shown. More specifically, neither Rosemount nor Broman, et al., considered alone or in combination, describes or suggests a method for predicting natural frequency responses for the purpose of determining duct support locations, wherein the method includes providing tube sub-systems including shrouded bellows components, experimentally determining a stiffness multiplier within the shrouded bellows components, and using the determined stiffness multiplier in a model to predict a natural frequency response.

While Applicants do agree that engine sub-systems and components were analyzed in the past to determine natural frequencies, Applicants respectfully submit that it would not have been obvious to evaluate such engine sub-systems using a method for predicting natural frequency responses, wherein the method includes providing tube sub-systems including shrouded bellows components, experimentally determining a stiffness multiplier within the shrouded bellows components from input values, and using the determined stiffness multiplier in a model to predict a natural frequency response. Rather, as described in the specification, in the past, modeling techniques used analytical models that approximated shrouded bellows natural frequency response with manufacturer-supplied test data, wherein the test data was typically obtained from static stiffness component testing. In contrast, the present invention uses test data from dynamic operating conditions based on the testing of several different shrouded bellows configurations. Accordingly, Applicants respectfully submit that the cited art teaches away from the present invention.

If art "teaches away" from a claimed invention, such a teaching supports the nonobviousness of the invention. U.S. v. Adams, 148 USPQ 479 (1966); Gillette Co. v. S.C. Johnson & Son, Inc., 16 USPQ2d 1923, 1927 (Fed. Cir. 1990). In light of this standard, it is respectfully submitted that the cited art, as a whole, is not suggestive of the presently claimed invention. More specifically, Applicants respectfully submit that the combination of Rosemount and Broman, et al. teach away from each other, as well as from the present invention. In particular, Broman, et al. describes the use of experimental results for use of verification only (Page 9, fourth paragraph, last sentence) and neither Rosemount nor Broman, et al. describe testing of sub-components to obtain dynamic stiffness from test data, to obtain a stiffness multiplier to use as input to a standard geometry bellows element. As such, there is no suggestion or motivation to combine Rosemount and Broman, et al.

Further, and to the extent understood, neither Rosemount nor Broman, et al., considered alone or in combination, describe or suggest the claimed combination, and as such, the presently pending claims are patentably distinguishable from the cited combination. Specifically, Claim 1 recites a method comprising the steps of "providing at least one tube sub-system including a plurality of shrouded bellows components, determining a stiffness multiplier within each of the shrouded bellows components from input values, using the determined stiffness multiplier in a model that applies a standard geometry element and a flexibility factor based upon the stiffness multiplier to predict a natural frequency response, and determining locations for duct supports."

Neither Rosemount Inc nor Broman, et al., considered alone or in combination, describe or suggest a method for predicting natural frequency responses, wherein the method includes providing at least one tube sub-system including a plurality of shrouded bellows components, determining a stiffness multiplier within each of the shrouded bellows components from input values, and using the determined stiffness multiplier in a model to predict a natural frequency response to determine locations for duct supports. Specifically, neither Rosemount Inc nor Broman, et al., considered alone or in combination, describe or suggest a method that includes determining a stiffness multiplier within each of the shrouded bellows components from input values and using the experimentally determined stiffness multiplier in a model to predict a natural frequency response. For at least the reasons set forth above, Claim 1 is submitted to be patentable over Rosemount in view of Broman, et al.

Claims 2-6 depend from independent Claim 1. When the recitations of Claims 2-6 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claims 2-6 likewise are patentable over Rosemount in view of Broman, et al.

Claim 7 recites a modeling system for determining natural frequency response of shrouded bellows components, wherein the system includes “a processor configured to determine a stiffness multiplier from input values.”

Neither Rosemount nor Broman, et al., considered alone or in combination, describe or suggest a modeling system for determining natural frequency response of shrouded bellows components, wherein the system includes a processor configured to determine a stiffness multiplier from input values. Specifically, neither Rosemount nor Broman, et al., considered alone or in combination, describe or suggest a modeling system that includes a processor configured to determine a stiffness multiplier from input values. For at least the reasons set forth above, Claim 7 is submitted to be patentable over Rosemount in view of Broman, et al.

Claims 8-13 depend from independent Claim 7. When the recitations of Claims 8-13 are considered in combination with the recitations of Claim 7, Applicants submit that dependent Claims 8-13 likewise are patentable over Rosemount in view of Broman, et al.

Claim 14 recites a system for determining natural frequency response of shrouded bellows components, wherein the system includes “a model configured to predict the natural frequency response as a function of a stiffness multiplier.”

Neither Rosemount nor Broman, et al., considered alone or in combination, describe or suggest a system for determining natural frequency response of shrouded bellows components, wherein the system includes a model configured to predict the natural frequency response as a function of a stiffness multiplier. Specifically, neither Rosemount Inc nor Broman, et al., considered alone or in combination, describe or suggest a system that includes a model configured to predict the natural frequency response as a function of a stiffness multiplier. For at least the reasons set forth above, Claim 14 is submitted to be patentable over Rosemount in view of Broman, et al.

Claims 15-19 depend from independent Claim 14. When the recitations of Claims 15-19 are considered in combination with the recitations of Claim 14, Applicants submit that dependent Claims 15-19 likewise are patentable over Rosemount in view of Broman, et al.

In view of the foregoing amendments and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully Submitted,



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